

Application No.: 10/535,377
Attorney Docket No.: SMI-0003
Reply to Office Action of April 21, 2008
Amendment/RCE dated: August 20, 2008

Listing of Claims:

Please amend the claims of the application as follows. This Listing of Claims will replace all prior versions and listings of claims in the application:

Claims

1. – 31. (Canceled)

32. (Currently Amended) A method for producing chemically-doped boron doped with using a dopant ~~amount of a desired dopant element~~ vapor comprising the steps of: ~~mixing a boron compound in a vapor state with a boron compound reducing gas and a controlled amount of a material containing the dopant element, said material being in a vapor state or entrained in a vapor,~~ effecting a controlled addition of a dopant vapor to a boron containing vapor to form a gaseous mixture; and, heating the gaseous mixture in a reaction vessel to a reaction temperature to produce chemically-doped boron doped with a controlled concentration of the dopant element.

33. (Currently Amended) A method according to claim 32 wherein said ~~reducing gas is~~ boron containing vapor includes hydrogen gas.

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34. (Currently Amended) A method according to claim 32 wherein said boron ~~compound in a vapor state is~~ containing vapor includes boron trichloride.

35. (Currently Amended) A method according to claim 32 wherein said boron ~~compound in a vapor state is~~ containing vapor includes boron trichloride[,] ~~said reducing gas is~~ and hydrogen gas, ~~and wherein they are mixed~~ in roughly stoichiometric proportions.

36. (Currently Amended) A method according to claim 32 wherein said ~~material containing the dopant element~~ vapor is selected from the group consisting of titanium tetrachloride, methyltrichlorosilane, and methane.

37. (Currently Amended) A method according to claim 32 for producing boron doped with titanium wherein the ~~reducing gas is~~ dopant vapor includes a mixture of hydrogen gas, ~~the material containing the dopant element is~~ and titanium tetrachloride[,] ~~and at least a portion of the hydrogen gas is bubbled~~ formed by bubbling hydrogen through liquid titanium tetrachloride to form a hydrogen/titanium tetrachloride mixture, ~~that is subsequently mixed with the boron compound in a vapor state.~~

38. (Currently Amended) A method according to claim 32 for producing boron doped with silicon wherein the ~~reducing gas is~~ dopant vapor includes a mixture of

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hydrogen gas, ~~the material containing the dopant element is~~ and methyltrichlorosilane[,] ~~and at least a portion of the hydrogen gas is bubbled~~ formed by bubbling hydrogen through liquid methyltrichlorosilane to form a hydrogen/methyltrichlorosilane mixture, ~~that is subsequently mixed with the boron compound in a vapor state.~~

39. (Currently Amended) A method according to claim 32 for producing boron doped with carbon wherein ~~the reducing gas is hydrogen and the material containing the dopant element is~~ vapor includes methane.

40. (Currently Amended) A method according to claim 32 wherein ~~said dopant~~ an amount of the ~~desired dopant element~~ in the chemically-doped boron ranges up to about 10 atomic percent.

41. (Previously Presented) A method according to claim 37 wherein the chemically-doped boron consists of about 90 atomic percent boron and about 10 atomic percent titanium.

42. (Previously Presented) A method according to claim 38 wherein the chemically-doped boron consists of about 1.5 to 8.1 atomic percent silicon.

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43. (Previously Presented) A method according to claim 39 wherein the chemically-doped boron consists of about 1.5 to 6.3 atomic percent carbon.

44. (Currently Amended) In a chemical vapor deposition process wherein a boron compound in a vapor state is mixed with ~~a boron compound reducing~~ hydrogen gas to form a reaction mixture, and the reaction mixture is heated to a reaction temperature to form boron and a ~~reduction~~ reaction product, the improvement comprising the step of ~~adding~~ making a controlled addition of a dopant vapor to the reaction mixture a controlled amount of a material containing a dopant element to form chemically-doped boron doped with a dopant amount with a controlled concentration of the dopant element.

45. – 55. (Canceled)

56. (New) A method according to claim 36 wherein the dopant vapor includes hydrogen gas.

57. (New) A method according to claim 32 further comprising the step of controlling the vapor pressure of the dopant vapor.

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58. (New) A method according to claim 32 further comprising the steps of metering the flows of the dopant vapor and the boron containing vapor to the reaction vessel.

59. (New) A method for producing chemically-doped boron doped using a dopant vapor that includes methyltrichlorosilane, said method comprising the steps of: forming a dopant vapor that includes hydrogen gas and methyltrichlorosilane by bubbling hydrogen through liquid methyltrichlorosilane; mixing the dopant vapor with a boron containing vapor to form a gaseous mixture; and, heating the gaseous mixture in a reaction vessel to a reaction temperature to produce chemically-doped boron.

60. (New) A method for producing chemically-doped boron doped using a dopant vapor that includes methane, said method comprising the steps of: mixing a dopant vapor containing methane with a boron containing vapor to form a gaseous mixture; and, heating the gaseous mixture in a reaction vessel to a reaction temperature to produce chemically-doped boron.